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THE REQUIREMENTS OF AN ADEQUATE NATURALISM.*

THE aim of the present investigation is to work out in a systematic fashion the possibility of an adequate naturalism. The time has come for a persistent effort to throw the scientific and philosophical insights of the last generation into an organized whole. If I am not much mistaken, the period of systems is again dawning for philosophy; systems, however, founded upon the careful integration of knowledge with criticism. I would not be surprised if something of finality resulted from the controlled speculation that is now feasible. At no time in the past have the materials and instruments of philosophy been so rich and carefully fashioned. A master mind has an opportunity for interpretative synthesis never before equaled. Surely before long the outline of an adequate world-view will be achieved.

That this coming world-view will be of the nature of an evolutionary naturalism is the thesis of the present work. I shall point out the main problems to be solved and accompany this indication of problems with pretty systematic attempts at their solution. Nowhere shall I willingly resort to ambiguity and equivocation. The problems of philosophy are, to my way of thinking, as specific as those of the special sciences.

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*[In the following pages we present the introductory chapter of Mr. Sellars's book on *Evolutionary Naturalism* which the Open Court Publishing Company will bring out in the spring. A few other chapters have appeared in *The Monist* previously. ED.]

Philosophy, like science, is a human achievement, and so rests upon man's capacities. Unlike science, philosophy is forced to consider those capacities and processes which make it possible. It is for this reason that philosophy is necessarily so engrossed with man. Knowledge is a human affair even though that which is known is distinct from the knower. But man is a part of nature, and so these capacities and processes operative in science and philosophy must find their natural explanation. Intelligence must be given its locus and attachments. In other words, science and philosophy are properties of man. To explain them, we must comprehend man's capacities and his place in the world. The final problem of philosophy is to connect the fact and content of knowledge with its conditions. How does knowing occur in the kind of a world that is actually known? Knowing is a fact and must be connected up with the world which the sciences study. Thus a system of philosophy answering this question is the keystone of science.

If this is the case, it is not strange that the possibility of an adequate philosophy waited upon the advance of the special sciences. The biological sciences had to be added to the inorganic sciences before the data for the solution of philosophy's problem approached completeness. The next task was to bring the mental sciences into such close contact with biology that the operations they bore witness to could be seen to be rooted in the organism. Only as this grounding of mind in the body became demonstrably evident did the conditions of a satisfactory philosophy exist. Only then did knowledge become, itself, a natural fact correlatable with all other natural facts. Philosophy is the science which explains the other sciences as human achievements, and thereby completes science.

As we pass from problem to problem, we shall see that the two great enemies of an evolutionary naturalism are *Platonism* and *Kantianism*. Both deny this self-explanatory character of nature. In a sense, they are both supernaturalistic.

Naturalism stands for the self-sufficiency and intelligibility of the world of space and time. Supernaturalism maintains that this realm is not self-sufficient and that it can be understood only as the field of operation of a spiritual reality outside itself. Historically and logically, naturalism is associated with science, while supernaturalism is the expression of an ethical and religious metaphysics.

The great difficulty confronting naturalism has been the inclusion of man in nature, an inclusion that would do justice to all his distinguishing characteristics. An adequate naturalism must not belittle man in order to press him into some rigid scheme. It must not be *a priori* in its methods and assumptions, but work creatively upon all that can be known about all phases of nature. To-day the naturalist has no excuse for little faith.

We have suggested that supernaturalism is the antithesis of naturalism. If naturalism stresses the self-sufficiency and intelligibility of nature, it can be defeated only by demonstrating the insufficiency of nature. In the past, theological speculation sought to prove the rational need for some primal source beyond nature, for a Necessary Being upon which the contingent world could be grounded. As is well known, the analyses of Hume and Kant gave pause to this direct and assured refutation of naturalism. The three proofs of scholasticism, the cosmological, the ontological and the teleological, were shown to contain assumptions which had small measure of plausibility when critically examined.

But Kant himself suggested a more subtle and indirect way of approach than that of the confident scholasticism of the precritical period, namely, an appeal to inner convictions or demands of the moral and religious self. But can man's life be divided by a hatchet into two compartments in this easy fashion? *Any semblance of plausibility in such a division was due to the Kantian disposal of the physical world as phenomenal.* Only because nature was more or less illusory could beliefs conflicting with the tide of natural fact retain their prestige.

Now as time passed, ethics and, with it, the theory of values were swept into the current of empirical investigation. English utilitarianism, evolutionism, a broader study of social facts, a more adequate psychology, all these new elements undermined the innate practical reason on its own ground. Psychologically and ethically, man was becoming a part of nature, comprehensible only genetically and biologically. The Kantian dualism between the theoretical and the practical reason no longer sounded relevant to the facts of human life. Man was a very complex whole immersed in and functioning in nature.

The strength of this more subtle attack upon naturalism lay, then, in two things: (1) its denial of physical realism, and (2) its assertion of a contradiction between determinism and empirical freedom. These two motives run through the opposition to naturalism characteristic of the nineteenth century. Idealism maintains, on the one hand, that physical nature is a realm of causal determinism and so contradicts man's freedom; on the other hand, that nature is a construction and not an independent reality. An adequate naturalism must meet both of these contentions. It must demonstrate the validity of physical realism as an epistemology and point out the possibility of reconciling causality with empirical freedom.

Naturalism has been given many meanings in the course of this age-long controversy. Most of these meanings have been slightly derogatory. The reader must, therefore, be on his guard against the application to the evolutionary naturalism forming to-day of interpretations which were in a measure those of the older, less adequate naturalism of the past. The ethics of modern naturalism, for instance, are by no means those of a crude Darwinism. We belong to a generation which has realized that, while man is an animal, he is not a brute.

Those who attack naturalism usually forget its larger setting and significance. They are not trying to save naturalism from injustice to itself but to destroy it for the greater glory of some view more kindly to supernaturalistic beliefs. Hence, we find naturalism identified without a remainder with naive materialism, positivism, agnosticism, the mechanical view of nature, etc. The weaknesses of past formulations were taken as conclusive for the basic fallacy of naturalism itself. But were anti-naturalistic positions any less open to criticism? The truth is that a secret animus was at work. But cannot the thinker examine these fundamental questions with the candor and objectivity of the best type of scientists?

In my own thinking, I have always hesitated to identify naturalism with naive materialism, positivism, the mechanical view of nature, or the bias of the physicist to reduce the whole world to facts of physics and nothing more. Has not the time come for the attempted formulation of a more adequate naturalism than those of the past? For a philosophy giving due weight to all the sciences and to the various sides of man's actual nature? The formulations of naturalism have often been narrow and harsh, while the demands of supernaturalism have been sentimental and exaggerated. The warfare between naturalist and anti-naturalist has resembled that between mechanist and vitalist in biology. While vitalism has gained little headway as a doctrine, it has prevented scientists from falling too completely into dogmatic slumber. But surely the time is becoming ripe for a step beyond the sharp contrasts of the past into a broad and sympathetic empiricism.

The Spirit of Naturalism and Modern Science.—The following characterization of naturalism is true to its spirit: "At first tentative, but becoming ever more distinctly conscious of its real motive, naturalism has always arisen in opposition to what we may call 'supernatural' propositions, whether these be the naive mythological explanations of world-phenomena found in primitive religions, or the supernatural popular metaphysics which usually accompanies the higher forms. It is actuated at the same time by one of the most admirable impulses in human nature—the impulse to explain and understand, and to explain, if possible, through simple, familiar and ordinary causes."[1] The spirit of naturalism would seem to be one with the spirit of science itself. And many formulations of naturalism have been the products of the speculatively inclined scientist in his moment of indulgence in far-reaching generalization.

The specialist works in his own field in accordance with the technique which he has inherited and refined. His is the task to secure data that will help to solve specific problems; and his views are often the reflections of his methods and habits. Yet if he is a man of keen curiosity with some natural bent for wider thought, he will sooner or later formulate views concerning the larger relations of things. In short, he will assume the role of philosopher and interpret fundamental questions in the light of the concepts and data with which he is familiar.

But these concepts and data are not necessarily ***sufficient*** for the foundation of an adequate naturalism. How could the physicist expect to do justice to chemical processes? Or the chemist to biological phenomena? Or the biologist to social institutions? Yet the specialist on his philosophical adventures is only too prone to postulate not only the truth of his categories but their sole sufficiency for all the problems confronting the mind. As against such an assumption, we shall argue that *all* the sciences contribute to the solution of ultimate problems. To attempt to solve the basic queries as to the nature of life in the light of physics alone is to challenge failure or a resort to sophistry.

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[1] Otto, *Naturalism and Religion*, p. 18.

Modern science has worked in favor of naturalism more successfully through the implications of its results than by means of wide-reaching speculation. It is the direction of the drift of the complex movement that is sensed. Hence, I shall be compelled to be rather hard upon the inadequate speculations of the older generation of thinkers even while sympathetic with their purpose. The time was not ripe for a philosophy of nature.

Two Common Forms of Speculative Naturalism.—Let it be borne in mind that we are not denying that science leads inevitably to some critical form of naturalism. The arguments of this book will show clearly enough that I believe that an adequate naturalism can be worked out. What we are suggesting is that the interpretation of the results of science is a far more difficult undertaking than has at times been realized. Consciousness, for instance, must be gotten into nature in a specific way in connection with the mind-body problem and not by throwing it into nature in a lavish and wholesale fashion. The two common forms of naturalism which we shall briefly discuss represent two stages which do not seem to come up to this critical level. The second form, positivism, comes nearer to this ideal than does naive materialism, the first form.

Naive materialism is a form of naturalism which has played a very important part in the history of thought. It is often now carelessly thrown aside with the remark that we know too much about matter now to take it seriously. I am not so sure of the truth of this statement. The newer views of matter are far more subtle than the views of a few generations ago. But I must admit that it is seldom easy to know the exact idea of the physical world held by either materialists or anti-materialists. Both are stronger on assertion than on exposition.

The older materialism declared that physical reality consists of matter and motion. The notion of matter was probably that of the science of the period—hard particles affecting one another by contact. Just what the stuff of these particles was conceived as being I cannot make out. In short, it seems to me that this older materialism was largely the generalization in an uncritical fashion of the dominant mechanical view of the world. And just because it belittled such grave questions as those presented by life and mind or else had inadequate conceptions of these realities, it did not fulfil the conditions of an adequate naturalism. Naive materialism never realized the importance of epistemology. How do we come to know matter? The world we see is clearly a sensuous world; the world of matter in motion is an abstract, conceptual world. By what right do we pass from the one to the other and declare its superior validity? It would seem that the materialist of the uncritical type passes to a schematized vision of the physical world much as the interested reader uses words as mere symbols of meanings. He tends to give scientific concepts a vague ontological existence as intuitions of the very stuff of physical being. I frankly confess that it is not always easy to do justice to naive materialism just because it is not philosophically articulate. I think that it was Royce who said that the materialist was the thinker who believed that all phenomena could be expressed in terms of differential equations of the second degree. There is a large measure of truth in this characterization. The scientist is only too apt to exalt his science's formulas and to make them universal. The materialist is the naturalist who reads nature in a limited way and believes that he has exhausted its possibilities.

I frankly recognize that there is a measure of arbitrariness in this description of materialism. It is a term which, after all, has no univocal meaning. For some, it means little more than naturalism as a sort of faith. They would reject any but the most modern ideas of matter and energy. Yet I think that materialism can rightly be associated with a certain degree of epistemological simplicity and with a tendency to reduce higher natural processes to lower without a remainder.

Scientists who have given themselves to speculation often temper their physical realism with agnosticism and animism. Thus Büchner argues that matter and force are inseparable. "There is no force without matter—and no matter without force." The stuff of the universe is dynamic. Matter is that which *manifests* itself in the various energies of light, heat and motion. These energies are measurable, but that which lies back of them is *unknowable*. But just because matter is unknowable, it can be endowed with all sorts of potentialities. It can be endowed with intellectual force as well as with physical force. It is noticeable that Spencer, although far more sophisticated, argues in much the same fashion that force is an unknowable source for all the phenomenal effects we experience. "By the Persistence of Force, we really mean the persistence of some Cause which transcends our knowledge and conception." Spencer's looseness of thought has been so unsparingly exposed by Ward that it is hardly necessary to go over the ground again. It should be noted that there is an unbridgeable gulf between our experiences and this unknowable, and that persistence means alternately quantitative constancy and permanence of being.[2] Haeckel is another example of the militant scientist on speculation bent. The following quotations give some idea of his daring generalizations. "The two fundamental forms of substance, ponderable matter and ether, are not dead and moved only by extrinsic force, but they are endowed with sensation and will (though, naturally, of the lowest grade); they experience an inclination for condensation, a dislike of strain; they strive after the one and struggle against the other." "Attraction and repulsion seem to be the sources of *will*—that momentous element of the soul which determines the character of the individual." Haeckel is obviously fighting for continuity. *But is continuity of an evolutionary type opposed to novelties?* There is another feature of this naive naturalism to which attention must be called. The experts in other fields are rather despised. Thus he pays his respects to psychologists after this fashion: "Most of our so-called 'psychologists' have little or no knowledge of these indispensable foundations of anthropology—anatomy, histology, ontogony and physiology.... Hence it is that most of the psychological literature of the day is so much waste-paper."

What shall be our comment upon these analogous forms of materialism? I think that our chief criticism must be that matter and energy become unknowables to which are assigned in a verbal way just those capacities which are necessary to meet unpleasant problems. What explains everything in this enigmatic fashion explains nothing. The intention is in a way commendable. Reality must be of a sort to account for the world as we experience it. Yet the connection between reality and experience is of the slightest. Philosophy becomes unanalytic and vague, a series of assertions which are not explanatory because knowledge of the unknowable is contradictory. Can the unknowable evolve and acquire new properties? Or is it always and everywhere alike in a static and dead-level way? The familiarity of the terms used suggests a directness and specificity which they do not possess as metaphysical symbols. We swing back and forth between scientific realism, for which matter and energy are determinate entities, and a vague agnosticism in which they are postulated as sufficient reasons for whatever occurs in the phenomenal realm.

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[2] Cf. Spencer, *First Principles,* sec. 191, stereo. ed., p. 552; and James Ward, *Naturalism and Agnosticism,* 4th ed., p. 213.

The shortcomings of these uncritical forms of naturalism led scientists, better acquainted with the history of speculation, to develop various forms of *positivism*. There may, or may not, be a reality outside the reach of experience, but science affords us the only valid knowledge we can attain. The methods of the physical sciences have justified themselves by their results. Here are data co-operatively found and recoverable; here are empirical laws stating invariable relations between terms. This information satisfies the intellect and guides human behavior in successful ways. What more can be desired? The aims of metaphysicians are illusory. There are no things-in-themselves, no substantial reality of a transcendental kind. Terms like matter and energy and force should be kept to their analyzed, empirical meaning; for they are merely concepts descriptively useful in the organization of experience.

These positivistic forms of naturalism when examined in detail in the writings of Pearson, Mach and Poincaré show how dependent a naturalistic philosophy is upon theory of knowledge. Although securing much of their prestige from their standing as scientists, they plunge immediately into psychology and logic. Pearson becomes a Humean sensationalist. Mach seeks to establish neutral entities or elements which are physical and psychical according to their relations. Poincaré attempts to justify science by demonstrating the exactness of its results and the control exercised by the facts of observation. Thus they write, not so much like scientists indicating the reality of the physical world and of the validity of our knowledge of it, as like descendants of Hume and Kant. They succeed in showing the naïveté of old-fashioned materialism and the uncritical use of scientific concepts by speculative naturalists, but they cannot be said to prove the sufficiency of their own positivism. In short, they are philosophers whose training has been in science rather than in philosophy. Consequently, they possess the defects as well as the merits of their training and outlook.*

Is it too much to assert that the speculations of scientists turned philosophers have demonstrated the necessity of theory of knowledge as a condition of an adequate naturalism? The need naturalism has for a well-founded epistemology has thus been made clear both by its exponents and by its critics. It is, as James Ward points out, a tentative philosophy, and yet a philosophy which has not taken advantage of the critical analyses offered by experts in the field. But why has it neglected these offerings? For two reasons in the main. The scientist has become a specialist seldom acquainted with the situation in philosophy, and, what is more, inclined to be contemptuous of it. Hence, when he starts to speculate, he does it boldly from his own stock-in-trade. In the second place, nineteenth-century philosophy was largely romantic in its bias and itself inclined to be condescending to science. Instead of cooperating, science and philosophy went their separate ways. But this cooperation is an essential condition of the discovery of a true naturalism.

The Situation in Philosophy.—Above the technical differences between the various schools of philosophy and to a certain degree determinative of them, worked the opposition between naturalism and romanticism. Idealism has always been anti-naturalistic and favorable to what—for lack of a better term—may be called a religious view of the world. Naturalism, as we have already noted, represented the drift toward a lawful and, so far as possible, physical explanation of events.

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* For a more detailed criticism of these thinkers see my *Critical Realism*, Ch. 2.

While naturalism swung between materialism and positivism, idealism was able for a long time to present a unified front to its opponent. Especially was this the case in the English-speaking countries. Objective idealism was the dominant academic philosophy in England and the United States during the latter half of the nineteenth century. And idealism worked hand in glove with romanticism. It is not strange that the half-articulate naturalism of the time found it hard to cope with such an enthusiastic combination. Yet, on its side, it felt the comfort and support of the vigorous sciences springing up around it. The prestige of science confronted the prestige of religion. The tactical skirmishes between naturalism and idealism were practically always in favor of the latter, but the pressure of numbers on the other side made these victories Pyrrhic.

But the end of this period found new movements in philosophy. The ascendency of objective idealism was rudely challenged by pragmatism and later by realism. Pragmatism sharply criticized the constant appeal made by transcendental idealism to absolute and virtually nonhuman standards. It opposed the too-facile monism and dialectical temper of approach of its opponent. Thus the banner of empiricism was again raised and in a more critical form. The fruit of this new spirit is an alliance with the social and biological sciences and a flirtation with naturalism. Perhaps its weakness has been an unwillingness to develop a systematic metaphysics. And yet, in its latest manifestations, there can be no doubt of the sympathy of an instrumentalist pragmatism with a more broadly conceived naturalism.[3]

Realism is in deadly opposition to the cherished assumptions of idealism. While idealism has always maintained that the physical world as common sense and science conceive it is illusory if taken as more than phenomenal, realism accepts its independence of the knower and the non-mental character of nature. It will, I hope, be noted that I say non-mental and not anti-mental. As we should expect, realism finds itself in sympathy with the temper and ideals of science. Accordingly, the rise of realism makes possible that cooperative supplementation and interpretation of science by philosophy in which alone lies the hope of an adequate naturalism. Since the whole argument of the present work will concern itself with the pregnant union of science and realism, we need not stress the point further at present. In short, the situation in philosophy has ceased to be unfavorable to naturalism.

The Idealistic Criticism of Naturalism.—The current criticism of naturalism deserves attention; for those who desire to establish an adequate naturalism must heed the objections in the controversial literature. The whole truth was by no means on the side of the older naturalism, even though it did not reside in the camp of idealism (spiritualism) either. What is desirable is not eclecticism but a thorough overhauling of assumptions.

In the main, the chief objections to naturalism of the traditional sort fall under four headings: (1) the denial that the higher can be reduced to the lower without a remainder of supreme importance; (2) the claim that description is not explanation; (3) the existence of gaps in nature disastrous to naturalism; and (4) the refutation of realism or, as it was usually called, dualism. Let us glance at these objections. We shall see that they need careful interpretation to separate what is true in them from what is false.

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[3] This drift of pragmatism toward naturalism comes out quite noticeably in *Creative Intelligence,* a series of essays by American pragmatists. In his review of the last edition of Ward's book, McGilvary points out this fact.

We shall admit that there was much truth in the contention that the older naturalism sought to oversimplify by reduction, and we shall try to indicate the historical reasons for this mistake. Probably they reduce to two: the nonage of the biological sciences and the continued dominance of the kinetic conception of all physical processes. The idea of evolution was either unknown or its full implications unappreciated. The first tentative efforts at the application of the idea of evolution were wooden in the extreme. The fact of the matter was that the various connective sciences between physics and politics had not yet sufficiently developed to reach hands across to one another. Naturalism desired continuity between the various apparent levels of nature, but at first could conceive it only as meaning that the higher is nothing but the lower. But supernaturalism—and idealism was often ready to give it comfort—was friendly to the idea of discontinuity. The one wished to achieve continuity by a rough and dogmatic reduction; the other to establish discontinuity. The conditions of an adequate naturalism had not yet been reached.

The claim that description is not explanation itself needs explanation. To explain an occurrence is to give its *why,* the cause or conditions out of which it sprang. Such explanation is, in logic, contrasted with mere empiricism. To explain is to solve problems by the discovery of laws and relations, which are, to my way of thinking, cases of well-formulated knowledge about nature. Wrongly, I think, explanation is frequently thought of as a reference of events to an unseen essence or productive activity. When *explanation* is so conceived, the work of science is said to be detailed *description* of things and events as research presents them to our minds. It is what I would call knowledge about the physical world. Explanation of events must rest for us in such descriptive knowledge about their conditions and setting; and the logic of investigation must convince us that there is an essential fidelity to reality in such descriptive explanation. Professor Ward's thesis that such symbolic description as characterizes modern science is arbitrary in anything else than the symbols used is agnostic and unjustified.

What these critics of scientific explanation have in mind is, so far as I can make out, something as follows. We cannot intuit nature so as to appreciate the inner necessity which moves things to act as they do. Perhaps it would be better to speak of the inner expression of things of which their behavior is a function. Laws give knowledge about things in relation but no living glimpse into their counsels. To say that A attracts B is to say that B approaches A. But can we *sense* this attraction, this dynamic continuity which has this result? Assuredly not. Hence science does not really explain.

But can any other discipline penetrate to the veritable springs of change? Only the idealist makes this assumption, and he claims to achieve this ideal by analogy. Cause is desire and will. That may be, yet the scientist may well reply that what explains every event explains none. Scientific explanation with its specificity and genuine knowledge about things is as necessary and as valid as ever. The critics of science believe that they can supplement science and, I suppose, hope to clear the way for some mysterious teleology more harmonious with idealistic hopes than the matter-of-fact results of science. I must admit that I can see no escape along this path. There is a discoverable orderliness, massiveness and immanent executiveness about nature.

The frequent emphasis by idealists upon supposed gaps in nature cannot be regarded as an attack upon naturalism alone. On this point, naturalism and science are in the firmest alliance. Religious idealism displays a disposition to belittle science itself, and to build upon the fact that its tremendous tasks have not yet been completed. But those who comfort themselves in this way are like squatters who fear that the rightful owner may at any time appear and claim his property. The history of the struggle between vitalism and the physicochemical view of life illustrates this situation very well. As long as vitalism stood for a protest against too easy solutions, it was justified by the prodding it gave to facile dogmatism. But when it represented an appeal to some factor out of physical nature, it hampered research. Advances were achieved in spite of it instead of by it. Let us admit that the conception of evolution is an hypothesis. What better systematizing theory is there to put in its place?

But the strategic attack upon naturalism made by spiritualism has always involved the supposed proof that physical realism is epistemologically faulty. We shall have much to say of this in the next two chapters, but we have already paid our respects to the contention, elsewhere. Spiritualism has been avid to prove that science deals only with phenomena. Granted this by bewildered science, it has gone on to argue that orderliness and intelligibility of phenomenal arrangements implies an orderer. We might well ask it to supply the major premise of this argument. May not our own intelligence be an expression of this innate orderliness of nature? But the assumption which modern realism will not admit is that nature is phenomenal. We know nature through the data it controls in our minds. The data, not nature, can be called appearances.

The Inadequacy of Past Naturalism.—Aside from its philosophical immaturity, past naturalism had three main weaknesses. These we have in a measure already rehearsed, but a degree of repetition from another angle may be of advantage. Naturalism sought too blindly to reduce or disintegrate, as though novelty could not arise, as though the organic could be only the inorganic. It was dominated almost entirely by the exact sciences with their stress upon quantities. And it did not enough recognize the reality of mind and of those human organizations and events for which mind is pivotal. In brief, past naturalism did not take evolution seriously nor did it take mind seriously. As we shall try to show in the course of our general argument, these two shortcomings are very closely connected. An adequate naturalism must reckon without condescension with biology, psychology and sociology.

To explain by means of analysis is an ideal native to science. Only by tracing strands of dependency in the physical sciences, only by abstraction and selection in the logical sciences was knowledge able to advance. Experience comes to us too complex and interwoven for comprehension. Hence the early history of science is an account of the successful reduction of the complex to its elements. Movements are shown to be the resultant of components and optical processes of many vibratory factors; heredity to be carried by correlated unit-characters; personality in some measure an organization of acquired habits; and chemical compounds of recoverable elements.

But in its zeal for analysis, science often forgot the fact of synthesis. Because it could disintegrate and identify, it tended to ignore the organization which had been dissolved. In other words, the temptation was to level down, to say that chemical compounds are *nothing but* the atoms into which they can be disintegrated, to refuse to see the significance of the dynamic whole upon which operations had been performed. The result was a *naturalism of reduction.* The following quotation from James is a relevant criticism of this reductive naturalism: "The mention of material substance naturally suggests the doctrine of 'materialism,' but philosophical materialism is not necessarily knit up with belief in 'matter' as a metaphysical principle. One may deny matter in that sense, as strongly as Berkeley did, one may be a phenomenalist like Huxley, and yet one may still be a materialist in the wider sense, of explaining higher phenomena by lower ones, and leaving the destinies of the world at the mercy of its blinder parts and forces."[4] The old naturalism ignored novelty and evolutionary synthesis. An adequate naturalism must not make this mistake.

Was there not a tendency in the past to confuse conceptual analysis with physical analysis? The anti-intellectualist of to-day complains that analysis changes the facts or ignores relations. To assert that an organism has parts seems to him to deny that these parts are interdependent. To this complaint the realist can only reply that he does not see the necessity. But physical analysis, actual dissection, does destroy the whole. And there can be little doubt that kinetic theories favored the identification of physical and conceptual analysis.

This brings us to a consideration of the second source of weakness of past naturalism. It moved within the circle of ideas and facts native to the exact sciences. The consequence was an incompleteness of which thinkers interested in biological and mental facts rightly complained. The world tended to lose space-and-time-filling content and to assume a purely mathematical character. The evolutionary differences in nature were ignored as irrelevant. We shall have more to say of this situation when we come to treat of the mind-body problem. Recent discoveries in physics have, however, put a stop to this abstractive tendency. The physical atom has come to its own once more.

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[4] James, *Pragmatism*, p. 92.

And, what is even more significant, the category of organization and the idea of evolution are moving downward.

That the naturalism of the nineteenth century did not do justice to "mind" is pretty generally acknowledged. But we must remember that psychology was hardly a science as yet and that biology was largely natural history.

It is not surprising that little agreement could be found between such extremes as physics and introspective psychology. The idea of intermediate levels genetically connected had not arisen. And yet the fearless naturalist of the day sought to maintain that the laws of mental operations are similar to those found in mass movements. Thus this stage of naturalism appears in psychology as associationism of a sensationalistic type. Mental atomism corresponded to physical atomism. The aim of this associationism is apparent. If mental events are governed by laws similar to those found in physics, the disparity between the physical and the mental was surmountable. The older forms of psychophysical parallelism reflected this manner of approach to the mind-body problem.

But instead of bringing mind down to the brain as kinetically conceived, why may we not bring the brain up to the mind as empirically analyzed? Such is the endeavor of evolutionary naturalism. We shall hold that even psychophysiological parallelism does not do justice to the empirical facts.

Evolutionary Naturalism.—If naturalism is the view of the world which founds itself upon the results of science, it follows—does it not?—that the texture and breadth of naturalism will alter as the sciences alter and as science is enlarged by the frank admission of new sciences in the commonwealth of tested knowledge. So long as mechanics was the master science to which the other sciences were ideally reducible, naturalism was simplicity itself. It was a dogmatic metaphysics for which all occurrences could be adequately described in terms of equations. But its very simplicity was, as we have seen, against it as soon as reflection upon all features of the world attained maturity.

It was the growth of science, itself, that undermined the older naturalism. Philosophy could only have held naive naturalism at bay had this not been the case. It is, therefore, evolutionary naturalism that I shall seek to develop and defend. Chemistry, biology and psychology have become autonomous, concrete and profoundly expressive of evolutionary ideas. It is no longer possible for a *fair* critic to identify naturalism with the mechanical view of the world. Scientists are tentatively reaching out for more flexible and less dead-level ways of approach. Evolutionary naturalism is not a reductive naturalism.

While naturalism could plausibly be linked with mechanism and be called "physics treated as metaphysics," philosophy could make a dialectic use of sharp contrasts, such as blind necessity and human freedom, fixed law and purpose, chance and design, matter and spirit, etc. No one can deny the rhetorical effectiveness of these contrasts; nor, I think, can it be doubted that effective use of them has been made by idealistic writers. But it is time to lift the controversy above this dialectical level which, after all, got no one any great distance, and to live critically into the knowledge we actually possess to-day. *And yet I would not be understood as refusing to recognize the truth of much of that for which idealism stood in opposition to the older naturalism.* But has not the time come for a thorough overhauling of the epistemology and *Kategorienlehre* of the past? It is something of this sort—however imperfectly—that I hope to accomplish.

If, as even its opponents admit, naturalism is a view of the world which flows by inner necessity from the accomplishments of science, the philosopher can pride himself that his function is like that of an artist who adds finishing touches here and there to some massive, cooperative work. The evolutionary naturalism which the keen eye can discern is like the statue hidden in the marble. Much must be done before it can be released. Just because the common result of all the sciences is the concern of no one science, there is need of a discipline of a comprehensive nature.

As we have constantly suggested, the cooperative assistance open to philosophy takes two lines: epistemology and the analysis of the categories. Seldom is science aware of the need of a theory of knowledge, yet the scientist who attempts to speculate stumbles around rather blindly for lack of it. On the other hand, science begins to make use of new concepts or categories long before it has clearly formulated them. We should expect this "lag" if we bear in mind the fact that categories have their birth in experience and that experience comes bit by bit in new fields. A critical eye, not concerned primarily with specific problems, can note changes of ideas and methods of interpretation that the busy specialist will overlook. To analyze and comprehend these large "forms" of cognitive experience is the self-appointed task of the philosopher.

If naturalism is usually an implicit system of philosophy, let the philosopher who is in sympathy with science make it explicit. Let him honestly face all difficulties and at least show how they can probably be met. His can be no narrow naturalism limited to the physical sciences. The *whole* of man must be included in nature, and nature so conceived that this inclusion is possible.

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